CHAPTER 14 - Hot Mix Asphalt-Bike Path HMA-OGSC-SMA-Sections 02741-02743-02786-02744S

General :

Asphalt concrete pavement, OGSC (Open Graded Surface Course), and SMA (Stone Matrix Asphalt) are used extensively for paving highways and streets. Achieving a durable and high level of performance with these products requires careful attention during the site preparation, mixing, transporting, placing, and compaction processes. Good inspection and testing practices will result in a smooth riding and durable pavement.

In preparation for paving, a pre-paving conference should be scheduled and held involving the Resident Engineer and his crew as well as the contractor's /sub-contractor's and material supplier's personnel who will be involved in the mix production and paving operations. The following items should be considered for the conference agenda:

1. Discuss the mix design and confirm its' approval.
2. Review specification requirements with close attention to limitations and testing/acceptance requirements.
3. Review paving contractor's planned paving operations consider if sufficient number and type of equipment and good practice is being provided.
4. Plant Inspection.
5. Identify key personnel and their roles.
6. Review of traffic control plan specific to paving operations.
7. Discuss potential problems and solutions.

For guidance on application of prime and tack coats please see Chapter 6 of this manual.

The paving Contractor should carefully check each piece of equipment to be used during the paving operation. The quality of work produced is greatly affected by the condition of the equipment. If the equipment is in poor condition, work of poor quality is to be expected.

The paving Inspector should become familiar with the operation procedures for the following pieces of equipment so that potential problems can be caught early. The following are things to check on specific equipment:

A. The Asphalt Distributor Checklist
   1. Heaters and pump should be in good working condition

2. All gauges, measuring devices and tachometers should all be calibrated
3. Spray bars and nozzles unclogged and set for proper application
4. Is there a thermometer that indicates the temperature of the material?
5. Paving Inspector is to check for proper application of asphalt material.

B. Paver Checklist

1. Does the paver comply with specifications?
2. Is the Governor on the engine operating properly?
3. Are the slat feeders, the hopper gates, and spreader screws in good adjustment?
4. Are the wheeled tracks operating properly?
5. Is the screed heater working properly?
6. Are the tamper bars correctly adjusted for stroke and for clearance between the back of the bar and the nose of the screed plate?
7. Are the surfaces of the screed plates true and in good condition?
8. Are mat thickness and crown controls in good condition and adjustment?
9. Are the screed vibrators in good condition and adjusted. Is the oscillating screed in proper position with respect to the vibrating compactor?
10. Generally a Materials Transfer Vehicle (shuttle buggy) is used to transfer the hot mix to the paver. Is it operating smoothly?

C. Steel Rollers Checklist

1. Roller should be in good running condition
2. No excessive wear in steering
3. Scraping bars and wetting pads should be checked
4. Drums should be checked for beads or distortions and water tightness
5. Are vibrators working properly
6. Inspector is to check for smoothness during operation (starting, stopping, and reversing)

D. Pneumatic Rollers Checklist

1. Roller should be in good running condition
2. No excessive wear in steering
3. Roller tires should be checked for uniform pressure, size and ply. Tires are to be smooth, with no tread
4. Do average contact pressures of pneumatic-tired rollers comply

with specifications?

E. Hauling Equipment Checklist

1. Are trucks equipped with tarpaulins?
2. For cold weather or long hauls, are truck beds insulated?
3. Are trucks clean, no material from previous use?

The following are to be considered in inspecting the mix and its' placement.

A. Acceptance and Rejection of Mix

After the mix design is established and approved by the Region Materials Engineer for the project. It is the responsibility of the paving inspector and lab technician to check the following to insure that the mix delivered to the project meets the requirements of the mix design.

1. Asphalt Content.
2. Gradation.
3. Temperature (Mixing and Laydown, Rolling).
4. Uniformity of Mix (See that all aggregate is properly coated, well graded and that no segregation occurs).
5. See that there is no excessive asphalt in mix.

The inspector should notify the contractor's foreman or superintendent when rejecting mix as well as the Level IV Inspector and/or Resident Engineer.

B. Reasons for Rejection

1. Is the load thoroughly mixed? (Properly coated)
2. Temperature (does the temperature exceed the maximum/minimum mix design temp?)
3. Too lean or too rich (% of Bitumen)
4. Uniformity of aggregate and mixing (gradation, segregation)
5. Incorrect mix type (3/4", 1/2", OGSC etc.)
6. Contamination
7. Incorrect information on ticket (date, project number, location, mix design etc.)

C. Observe and evaluate mix, look for the following:

1. Proper proportions

a. Excess fine aggregate in mix will cause a lean, brown, dull appearance.
b. Too little asphalt in mix will cause a lean, granular, dull appearance.
c. Too much asphalt in mix will cause a shiny, slick, and greasy look.
d. A cold mix will have a stiff appearance and possibly uncoated aggregate.

2. Is material properly coated?

   a. If not, material may need longer mixing time.
   b. Material may be too high in fines content.
   c. Material needs more asphalt.

3. Excessive moisture in mix.

   a. May have some bubbling or boiling from free moisture in mix.
   b. Steam clouds may be visible on mat or while dumping truck.

4. Segregation

   a. Material in hopper has tendency to separate along outside and on gate hopper. This material should not be incorporated into the mix.
   b. Auger distributing material evenly.
   c. Cold screed board.
   d. Improper head of material covering Auger (top of Auger should be visible at all times, but the head of the asphalt material should be no lower than just below the auger's top).
   e. Gates should be properly adjusted.

5. Contamination

   a. Watch for diesel oil leaks either from trucks or lay down machine.
   b. Dirt from truck wheels or other sources.
   c. Foreign objects such as rags, papers, grass, large rocks, weeds, and all unwanted organic matter.
   d. Diesel fuel should not be used as a release agent on any of the contractor's equipment used in paving operations.

D. Paving Procedures

1. Rolling Procedures

   a. Roll from the outside to the inside of the mat, one-half width of roller overlapping. Contractor should establish rolling pattern with QC personnel monitoring compaction with nuclear density gauge. Observe process and advise Level IV Technician or Engineer of any problems.
   b. Prolonged stopping of roller on hot mat should be avoided.
   c. Gradual stops recommended. Quick stops are discouraged.
   d. All rollers must operate smoothly from forward to stop and to reverse.
   e. Proper turning at end of roller travel (steel wheel).
   f. Roller picking up material from mat.

      (1) May be lack of water on rollers.
      (2) Roller or tires too cold.
      (3) May pick up foreign substance (such as dirt, tack coat, etc.).
      (4) Bituminous surface may be too hot.

2. Cooling crosswinds affect rolling operations.

   a. Shield machine with skirting.
   b. Keep roller closer to lay down machine.
   c. Add additional, roller to speed up operations.

3. Temperature

   a. Temperature: When temperature of the air, in the shade, is below 50 degrees F for HMA/SMA or 60 degrees F for OGSC do not lay any asphalt material. Recommended mix temperatures for compaction are provided in the mix design. Check and document the mix temperature in trucks, windrow, and behind the paver.

4. Longitudinal and Transverse Joints

   a. Observe and ensure that lay down machine is laying a straight line and grade. The Paver leaves a straight and vertical edge adjacent to the next lane to be paved, when more than one pass is required to cover the width of the roadway. Completely compact each pass and tack the longitudinal edge

prior to placing the adjacent pass.

(1) Seam should be straight and matching mat in depth at joint.
(2) Temperature should be checked and recorded.
(3) Proper rolling should be exercised when rolling into adjacent lift.

b. Transverse joints. All passes should be brought up even, transversely, at the end of each production day.

(1) Contractor will place paper or other material at end of lift.
(2) To start, remove end material, tack new joint and resume paving, matching previously constructed end.
(3) Cut back transverse joint from preceding day if cut does not measure the full specified depth.
(4) Start off by tacking new joint and placing sufficient new material to match previous joint.
(5) Roll across joint first, then diagonally to finish.

Best use of lay down machine is to have continuous travel. Contractor should avoid hurry up and wait operation. The Contractor should have sufficient rollers at all times to keep pace with the paver's progress.

If any problems are noted, the responsible person for the contractor should be immediately notified as well as the level IV inspector. Remedy the problem before resuming or proceeding with paving operations.

The Inspector should keep careful documentation of the paving activities making sure to cover the following areas:

A. Always keep a Project Diary up to date in the IPAQ or hardbound books.

1. At the beginning of a diary, fill out all spaces applying to job, including inspector's signature and date.
2. Keep diary neat. The diary may be used in court.
3. Keep accurate daily information such as day and date, stationing, project name and number, and weather. Include notes of interest or special importance, such as discussions with the contractor representative. List all discrepancies, disagreements, and failures of contractor or representative to comply with specifications.

Variations, in machine operation, not complying with specifications Accidents or public related grievances. Any personal observations and include project stationing and any other information needed to back up you documentation.

4. Keep accurate and concise records of quantities of daily operation. i.e. tons, cubic yards, feet lateral and transverse, square yards, gallons, pounds, etc.
5. Check and obtain signed vendors certificates, certificates of compliance and document temperatures, grade, type, plant tickets, etc.
6. Record number of workers, equipment, weather, starting and ending time, and daily operation.
7. Document any Certificates received.
8. On the plant ticket, record the delivery temperatures of mix and initial the ticket noting verification of project location, name, and number as well as approved mix type. Turn tickets into Level IV inspector each day.

Sampling is as important as the actual testing performed on the samples. The inspector should be TTQP certified in the sampling/density module before procuring samples for acceptance. Refer to the UDOT Manual of Instruction Part 8 Materials, Sections 981, 984, and 985 for specific directions on random number generation, sampling, and sample reduction procedures. The inspector may be responsible for determining and marking out random test locations for acceptance samples, the method used as well as any data used to generate the offset and station locations should be recorded in writing and turned into the Level IV Lab Technician for inclusion in project documentation. Sample PG graded asphalt cement as outlined in QMP 509.

Plant Inspection: The inspector should carefully review Sections 01280 and 01455 1.9 of the standard specifications as well QMP 509 with the Resident Engineer prior to paving operations beginning. The inspector may be required to witness and document three 1 qt samples being taken, accepting 2 of those samples of the PG Grade asphalt cement used in the mix for each production day for submittal as acceptance samples. This provides an opportunity to ensure that the requirements in Sections 01280 and 01455 1.9 are being met on a regular basis.

Note: The Bike Path HMA acceptance requirements are significantly reduced review Section 02743 when placing this item.

Related Sections:

01280: Measurement

01452: Profilograph and Pavement Smoothness

01455: Material Quality Requirements

02742S: Project Specific Surfacing Requirements

02745: Asphalt Material

02746: Hydrated Lime

02748: Prime Coat/Tack Coat

02969: Optional Use of Reclaimed Asphalt Pavement (PG Binder Projects Only)

QMP 509

QMP 510

References:

Principles of Construction of Hot-Mix Asphalt Pavements;
Asphalt Institute MS-22
Hot Mix Asphalt Paving Handbook 2000; US Army Corp of Engineers
Designing and Constructing SMA Mixtures-State of the Art Practice;
NAPA Quality Improvement Series 122

HMA, OGSC, and SMA

SPEC	INSPECTION LEVEL	INSPECTION OBJECTIVE	INSPECTOR ACTIVITY
02741 02743 02786 02744S	Important	Prepare for Paving Operations. Confirm approved Mix Design.	Attend and participate in Pre-paving conference.
	Important	Ensure surface to be paved is properly prepared.	Inspect base and/or existing/rotomilled surface to see they meet plan &specification requirements. Document findings in diary and reports.
	Important	Ensure equipment and processes in the field are as discussed in pre-paving conference.	Observe equipment, manpower, and level of contractor's prepared-ness and execution. Observe mix characteristics and mat appearance. Document all information and limits of paving operations. Inform RE of any problems.
	Important	Ensure all required documentation, acceptance samples, and certification are procured, submitted and properly filed.	Procure batch tickets, check to make sure they are properly filled out, take and record temperatures of mix as delivered and behind the paver, establish and mark acceptance sample locations, procure samples if certified or receive from certified

			technician, submit to the lab. Document all activities and submit properly completed sampling paperwork.
	Important	Ensure that PG Asphalt Cement Samples are taken and submitted and inspect production plant operations.	Generate random sampling time, be present to witness and accept state PG Asphalt Cement samples, inspect plant operations, check for effective lime treatment, proper mixing temperatures/times, check for use of approved release agents. Submit samples to Central lab. Document all findings.

HOT MIX ASPHALT – Check List

Confirming	Attributes
YES ( ) NO ( ) N/A ( )	Reviewed assigned functions and then reviewed the contract plans, specifications, and special provisions, noting all provisions applicable to the assigned responsibilities.
YES ( ) NO ( ) N/A ( )	Ensure that the Hot Mix Asphalt has an approved mix design
YES ( ) NO ( ) N/A ( )	Traffic Control has been set to an approved traffic control plans and is safe for Paver, Roller, crew and Trucks leaving the paver.
YES ( ) NO ( ) N/A ( )	Each truck dumping has a weigh ticked and is collected by the Inspector.
YES ( ) NO ( ) N/A ( )	Temperatures are taken on the HMA to assure proper paving temperature. This is recorded on the weigh ticket along with station of that load.
YES ( ) NO ( ) N/A ( )	Ensure that proper thickness has been placed.
YES ( ) NO ( ) N/A ( )	Any mix that is segregated or not coated will not be paid for and the Resident Engineer is immediately informed.
YES ( ) NO ( ) N/A ( )	Ensure any rough or imperfections that appear behind the paver are fixed before they are rolled
YES ( ) NO ( ) N/A ( )	Document all information: Date, weather, times of any breakdowns, areas that contractor was informed of segregation etc, all equipment

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